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ABSTRACT

This document contains four symposium papers on adult learning in the workplace. "The Relationship between Workplace Learning and Employee Satisfaction in Small Businesses" (Robert W. Rowden, Shamsuddin Ahmad) reports the results of a study of the nature and extent of HRD, level of job satisfaction among workers, and correlation between HRD activities and job satisfaction at small and midsize businesses in the United States and Malaysia. "Reframing the Andragogical Model of Adult Learning" (Elwood F. Holton III, Richard A. Swanson) examines the traditional model of andragogy and presents an expanded model, called Andragogy in Practice, that includes consideration for factors such as the following: individual learner differences, situational differences, and goals and purposes of learning. "A Holistic Model of Knowledge and Adult Learning" (Baiyin Yang) proposes a holistic theory of knowledge and learning according to which knowledge consists of three indivisible facets (explicit, implicit, and emancipatory) whose dynamic interrelationships must be considered when seeking to gain a better understanding of different learning modes. "The Nature of Adult Workplace Curiosity" (Thomas G. Reio, Jr.) reports on a study of 233 adults who completed four well-known curiosity instruments. (MN)

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1 **Adult Learning in the Workplace**

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The Relationship Between Workplace Learning and Employee Satisfaction in Small Businesses

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Studies of HRD tend to focus on large firms even though small businesses constitute 98 percent of U.S. firms. Recent studies have found evidence of extensive HRD in small businesses. Other recent studies found a higher level of job satisfaction among employees of small firms than employees of larger firms did. This study measured the nature and extent of HRD; the level of job satisfaction among workers; and determined the correlation between HRD activities and job satisfaction in small to mid-sized businesses. The study is also looking at cross-country comparisons with Malaysia.

Keywords: Workplace Learning, Job Satisfaction, Small Businesses

For businesses in the United States to remain competitive in an increasingly global economy, some are calling for drastic measures to be taken with regard to training and developing the workforce. Business and government leaders continually lament the lack of motivation, education, and job skills of the U.S. workforce yet offer few concrete suggestions about how to remedy the problem. For the most part, business and industry has acknowledged at least partial responsibility for training and educating the workforce. In fact, it is estimated that $60.7 billion (USD) a year is spent on training (Training Industry Report, 1998).

Firms in all parts of the world invest heavily in human capital. For example, U. S. firms invest, on average, $1,800 (USD) per year per employee in training and development. British firms invest approximately $5,000 (USD) annually per employee and Germany invests an average of $7,500 (USD) annually per employee. Furthermore, estimates suggest that about 8 percent of new employees receive formal training in their first year of employment in U. S. firms and 20 percent of new employees receive such training in European firms, and 74 percent receive such training in Japanese firms (Hitt, 1998).

Developing the human resources of a company would seem to be key to increasing production and closing the gap between the level of worker skill and present and future needs. Businesses that have made training, education, and development a priority have seen it pay off through greater profitability and increased worker satisfaction (Coblentz, 1988; Filipczak, 1989). Recent studies have found that worker satisfaction is rarely tied to pay and promotion; but rather, workers are more interested in such things as feeling appreciated, being "in on things," and career development (Buhler, 1994; Dolan, 1996) all of which have linkages to workplace learning.

Job satisfaction is simply how people feel about their jobs and different aspects of their jobs. There are important reasons why organizations should be concerned with job satisfaction, which can be classified according to the focus on the employee or the organization. First, the humanitarian perspective is that people deserve to be treated fairly and with respect. Job satisfaction is to some extent a reflection of good treatment. It also can be consider an indicator of emotional well being or psychological health (Haccoun & Jeanrie, 1995). Second, the utilitarian perspective is that job satisfaction can lead to behavior by employees that affects organizational functioning, as well as a reflection on organizational functioning. Differences among organizational units in job satisfaction can be diagnostic of potential trouble spots (Beatty, 1996). Each reason is sufficient to justify concern with job satisfaction. Combined they explain and justify the attention that is paid to this important variable.

Indeed, Buhler (1994) emphasizes the point when she talks about the continued effort organizations must place on employee satisfaction and the economic importance to the company. "Organizations that believe that workers are easily replaced and do not invest in their workers send a dangerous message. This often results in high turnover, which is accompanied by high training costs, as well as hiring costs. . . .it fosters the same type of attitude in the employee, that the company can be replaced and little loyalty is felt" (1994, p. 10). These studies make it clear that companies must take advantage of all workplace learning opportunities if they are to remain successful.

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However, until recently, most studies of this nature have been conducted in large corporations. Few firms in the samples have had annual sales of less than $1 billion (USD). However, most U.S. businesses are small to mid-sized with annual sales well under $10 million (USD) (Lee, 1991).

Small businesses are playing an increasingly important role in the U.S. economy. In the course of the nineties, Fortune 500 companies "shed some 3.5 million jobs" (Dumaine, 1996, p.23). Small businesses (those employing 100 people or less) constitute 98 percent of U.S. businesses (Dumaine, 1992) and "small businesses are responsible for 82 percent of the jobs created in the United States" (Megginson, Scott, Trueblood, & Megginson. 1995, p. 247). Yet, of the more than six hundred thousand small businesses started each year, 80 to 85 percent fail in the first five years (Small Business Handbook, 1990). The economic well-being of some regions of the United States is dependent upon small businesses where the majority of businesses (88 percent) employ fewer than 200 people (U.S. Department of Commerce, (1990-91).

To date, little is known about the relationship between workplace learning and employee satisfaction in small to mid-sized companies. Studies by Des Reis (1993) and Rowden (1995) have found that such firms may not even be aware of the nature and extent of learning in their workplaces. Yet it is likely that the success of such companies is at least attributable to the ways in which employees are attended to, formally and informally trained, and developed.

Statement of the Problem

This study will establish the nature and extent of workplace learning, and delineate the relationship between workplace learning and employee satisfaction in small to mid-sized businesses in the United States and Malaysia.

Conventional wisdom says that small businesses do not have the financial resources nor the time to do very much, if any, training and development or workplace learning. This position has been supported each time quantitative research has been conducted in a variety of small businesses. However, a recent qualitative study (Rowden, 1995) found that, in fact, small businesses do engage in a considerable range of formal, informal, and incidental workplace learning activities. The information gleaned from the interviews, observations, and documents provide a new foundation upon which questionnaires can be developed that can assess the extent of workplace learning from a perspective that small businesses truly understand.

Another recent study (Anonymous, 1997) found that workers in small businesses were generally more satisfied with their employment situation than were workers in larger companies. The study found that 44 percent of the workers in small businesses said they were "extremely satisfied" with their jobs, compared with 28 percent at companies with 1,000 or more workers. The study speculated at some factors that lead to this sense of satisfaction in small businesses such as job security, empowerment, and the ability to do what they do best. While workplace learning was not one of the indicators in the study, the small business respondents reported they could learn and grow on the job. An assumption of this study is that a sense of satisfaction an employee feels about his or her employment can be directly linked to the efforts toward workplace learning

Therefore, this study establishes the nature and extent of workplace learning in small to mid-sized businesses; establishes the level of job satisfaction reported in the same small to mid-sized businesses; and establishes the relationship between these learning opportunities and the level of employee satisfaction in these organizations.

Methodology

A quantitative research design was deemed the most appropriate way to understand the relationship between workplace learning and employee satisfaction. A survey instrument was developed that captures the essence of the findings on workplace learning revealed by the Rowden (1995) study combined with the Spector Job Satisfaction Survey (1997).

As with most studies of this sort, locating appropriate businesses and gaining agreement to conduct the inquiry was very difficult. There is no central clearinghouse for small businesses. The Small Business Administration does not maintain a list of small businesses throughout the U.S. Dun and Bradstreet has a section for small businesses, but it is limited to publicly traded firms. The Private Industry Council maintains a list but it is limited to members of the PIC, and most small to mid-sized businesses are not members of the PIC. The local Chamber of Commerce maintains a membership list but it is by city or region only. The use of their list would require contacting the several hundred thousand local Chambers, and again, many small businesses are not

members.

The best means of locating a broad-based population of small businesses was through the use of INC Magazine's 1998 list of the 500 Best Small Businesses and the Forbes Private-500 list of the top privately held small businesses in the U.S. While use of such lists does constitute a convenience sample, this was deemed the most appropriate way to locate a wide variety of small to mid-sized business throughout the United States. These lists carried small businesses from all arenas and identified firms that fell within the criteria of the study.

To date, 34 companies have been contacted with three agreeing to participate in the study. These three companies have yet to return their surveys. Part of the difficulty in finding companies that will participate is the requirement that nearly all workers in each company need to complete the survey. The surveys are administered by the principle of the company (owner, president, CEO, or General Manager). Once completed, they are mailed back to the researcher. This method is less intrusive to the company.

Greater success has been had in Malaysia. There five companies have also agreed to participate in the study. These companies have returned a total of 228 surveys. The process for distribution of the survey was they same. Potential companies were identified through a relationship with the university rather than through use of a list as the country is much smaller than the U.S.

Instrument Development

There is limited research on HRD in small to mid-sized businesses. Most people believe that small businesses do little, if any, development of their workers. For example, *Training Magazine*, which conducts a huge study of the training industry in the U.S. annually, does not even attempt to contact businesses with fewer than 100 employees. Companies with between 100 and 500 workers only constitute around 16 percent of their sample.

Several attempts have been made to determine the nature and extent of HRD in small business resulting in confirmation of this notion. A review of several of the studies determined that a likely cause of the lack of discovery of workplace learning in small businesses was due to the design of the surveys. A qualitative study by Rowden (1995) did reveal numerous indices of workplace learning in small to mid-sized businesses. By looking at the transcripts of interviews of workers and field notes of the researcher, it was believed that previous attempts to capture workplace learning in small to mid-sized businesses was due in large part by the language of the questionnaire. Making every attempt to stay as close as possible to the language and references used by actual workers in small to mid-sized businesses, a survey was developed to attempt to capture the nature and extent of workplace learning in these businesses.

The research on job satisfaction in small businesses mirrors that of HRD in small businesses. Until a recent study by Anonymous (1997), little attention had been paid to worker job satisfaction in small businesses. This study found that workers in small businesses, generally, were more satisfied with their work than were workers in larger businesses. The study did not, however, seek to determine *why* the workers were more satisfied. The study mentioned ideas like better communication, a feeling of being in on things, and a smaller power distance—but none were actually measured. Again based on the Rowden (1995) study, a possible connection could be made between workplace learning and job satisfaction. To determine if this hypothesis were true, workplace learning and job satisfaction would have to be measured in the *same* small businesses. Then, correlational measures could be made to determine if small to mid-sized businesses with high measures of workplace learning *also* had high measures of job satisfaction. The Spector (1997) Job Satisfaction Survey was determined to be the best-validated and reliable instrument for this purpose. A modified version was incorporated into the questionnaire along with request for background data.

Once developed, the instrument was reviewed by area experts and graduate HRD classes to ensure for content validity. The Malaysian version required some modification for cultural differences. For example, religious education had to be added since this is often provided for by Muslim employers and the "married—not married" question had to be expanded to cover all possibilities since the feedback indicated "not married" sounded too much like a *curse* to them.

Measures

The three constructs or dependent variables for the workplace learning portion were formal, informal, and incidental learning. The formal learning scale (10 items, Chronbach's alpha = .80) included items measuring respondent's perceptions of planned, organized training activities. The informal learning scale (8 items, r = .82) included items measuring respondents perceptions of unplanned or spontaneous activities that lead to perceived learning on the job. The incidental learning scale (6 items, Chronbach's alpha = .78) included items designed to

measure respondents perception of normal workplace activities that resulted in learning even though that was not the purpose of the activity—a side benefit of the work activity.

The nine dependent variables for the job satisfaction portion were pay, promotion, supervision, benefits, contingent reward, operating procedures, coworkers, nature of work, and communication. The pay scale (4 items, Chronbach's alpha = .75) includes items measuring respondents perception of the fairness of compensation and raises. The promotion scale (4 items, alpha = .73) measures their perception of the availability and fairness of promotion opportunities. The supervision scale (4 items, Chronbach's alpha = .82) measures the respondents perception of the quality and effectiveness of supervision. The benefits scale (4 items, alpha = .73) looks at the perceived value of fringe benefits. The contingent rewards scale (4 items, Chronbach's alpha =. 76) measures the respondents satisfaction with rewards (not necessarily monetary) given for good performance. The operating conditions scale (4 items, alpha = .62) measures the respondents satisfaction with rules and procedures. The coworker scale (4 items, Chronbach's alpha = .60) measures the respondents perception of the caliber and quality of coworkers. The nature of work scale (4 items, alpha = .78) measures the respondents satisfaction with the type of work done. The communication scale (4 items, Chronbach's alpha = .71) measures the respondents satisfaction with communications within the organization. The JSS scale received a total Chronbach's alpha of .91.

Analysis

The data was analyzed in a variety of ways. First, simple descriptive statistics (means; measure of variation—standard deviations; frequencies) were employed for the surveys from each company to determine the nature and extent of workplace learning in that company, and to determine the level of employee satisfaction in that company.

Then all independent variables having both theoretical significance and adequate variability were submitted to one-way analysis of variance (ANOVA), in order to identify significant relationships and to focus subsequent analysis on key variables. Inferences were based on F-value which compared the between group variance and within group variance. The Tukey-HSD method with .05 significance level was used for the procedure. The application of one-way ANOVA was based on the test of homogeneity of variance using Leverne's statistics. In cases where there was non-homogeneity in variance, a non-parametric statistics using Kruskal Wallis test was employed.

The Pearson product-moment correlation was conducted to determine the strength and direction of relationship between workplace learning and employee satisfaction across the companies. The sign of coefficient indicates the direction of the relationship. A positive correlation coefficient (r) indicated a positive relationship, while a negative coefficient reflected otherwise. The greater the absolute value of the coefficient, the stronger the relationship, and vice versa. The significance level of .05 (one-tailed) was used in this study.

When complete, descriptive comparison will be made between findings in the United States and Malaysia

Findings

Description of the Sample

Insufficient data was available from U.S. companies at the time of this writing to allow for analysis. However, 228 respondents from five Malaysian firms have responded and those data were analyzed. The five companies consisted of a manufacturing firm, financial services (2), an educational/training company, and a non-government organization (NGO). The manufacturing firm has been in business for 11 years, employs 54 people, and has gross annual revenues of RM 3, 000,000. The financial services companies have been in business for around 10 years, employ a combined 150 people, and produce annual gross revenues of RM 360,000,000. The training company has been in business for eight years, employs 100 people, and has gross revenues of RM 3,000,000. The NGO has been in business for 12 years, employs 124 people, and while it does not generate revenue it has an annual budget of RM 2,000,000.

All the respondents worked full time. Fifty two percent were female. Twelve percent were managerial, fifteen percent were supervisory, sixteen percent were technical, twenty eight percent were administrative / secretarial, and twenty nine percent were production. Twenty nine percent were between 21 and 34 years of age, thirty six percent were between 35 and 44, twenty four percent were between 45 and 54, and ten percent were over 55 years old. Sixty three percent were married. The managers reported earning more than RM 4000 per month, the supervisory and technical people earned between RM 2000 and RM 4000 per month, and the administrative and production workers all reported earning between RM 1000 and RM 3000 per month. (at the time of this writing, the

currency conversion rate was RM 3.8 = $1 US). Seventeen percent had been employed less than one year, sixteen percent had been employed for between one and three years, twenty two percent had been employed between three and five years, twenty eight percent had been employed between six and ten years, thirteen percent had been employed between eleven and twenty years, and four percent had been employed for more than twenty years.

Results

Fifty seven percent of the respondents indicated that they engaged in formal workplace learning activities. Sixty three percent indicated that they engaged in informal learning activities. And, seventy one percent of the respondents indicated that they engaged in incidental learning activities in the workplace. Sixty two percent of the respondents indicated that they were either very satisfied or satisfied with their job, indicating a high level of job satisfaction. While the sample is limited to five companies, there is a high correlation (.87) between the levels of workplace learning and job satisfaction.

Discussion and Conclusion

This is obviously a preliminary report on a long-term project that still has a long way to go. Even so, these findings are significant for exploring the relationship between workplace learning and employee satisfaction. A number of practical implications can be drawn that are of interest to HRD and managers in companies small and large, in day-to-day operations. Additionally, it would also bear great significance for teachers of human resource development, human resource management, and management. This material could provide techniques to promote operational methods to help assure organizational success.

The majority of the respondents in these small businesses indicate that they engage in activities that relate to workplace learning; and, the respondents in these same businesses indicate that they have a high level of job satisfaction. The first major finding is that it is possible to develop an instrument that measures HRD in small businesses. This quantitative method verifies previous qualitative findings. Also, the high correlation between workplace learning and job satisfaction leaves open the possibility that further study will be able to firmly establish a link between organizations that promote learning in the workplace and the level of job satisfaction experienced by their workers. As more data comes in from companies in the U.S. additional data analysis will be conducted.

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Reframing the Andragogical Model of Adult Learning

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The andragogical model has stood for many years as a central model of adult learning. However, the model never explicitly accounted for a number of factors that may alter applicability of the core principles in a given learning situation, even though Knowles writes that the model must be adapted to fit the situation. An expanded model, Andragogy in Practice, is offered that more explicitly accounts for factors that must be considered in shaping andragogy to fit the situation.

Keywords: Andragogy, Adult Learning

In the late 1960s when andragogy and the concept that adults and children learn differently was introduced in the United States by Knowles, the idea was groundbreaking and sparked much subsequent research and controversy. Since the earliest days, adult educators have debated what andragogy really is (Henschke, 1998). Spurred in large part by the need for a defining theory within the field of adult education, andragogy has been extensively analyzed and critiqued. It has been alternately described as a set of guidelines (Merriam, 1993); a philosophy (Pratt, 1993); or a set of assumptions (Brookfield, 1986). The disparity of these positions is indicative of the perplexing nature of andragogy; but regardless of what it is called, "it is an honest attempt to focus on the learner. In this sense, it does provide an alternative to the methodology-centered instructional design perspective" (Feur & Gerber, 1988). Despite years of critique, debate and challenge, the core principles of adult learning advanced by andragogy have endured (Davenport & Davenport, 1985; Hartree, 1984; Pratt, 1988), and few adult learning scholars would disagree with the observation that Knowles' ideas sparked a revolution in adult education and training (Feur & Gerber, 1988). Brookfield, positing a similar view, asserts that andragogy is the "single most popular idea in the education and training of adults" (1986). Adult educators, particularly beginning ones, find them invaluable in shaping the learning process to be more conducive to adults.

However, these core principles are also incomplete. There are a variety of other factors that affect adult learning in any particular situation and may cause adults to behave more or less closely to the core principles. These include individual learner differences, situational differences, and goals and purposes of learning. Andragogy works best in practice when it is adapted to fit the uniqueness of the learners and the learning situation. Unfortunately, the andragogical model has never explicitly accounted for these situational differences although Knowles (1984) always stressed adapting andragogy to fit the situation:

> The andragogical model is a system of elements that can be adopted or adapted in whole or in part. It is not an ideology that must be applied totally and without modification. In fact, an essential feature of andragogy is flexibility (p. 418).

The purpose of this paper is to re-examine and update andragogy as a guiding framework for adult learning. A model is developed, called "Andragogy in Practice," which places the core principles of andragogy in a framework to make it more flexible and adaptable. This is accomplished by explicitly accounting for other factors that affect the learning situation. A secondary purpose is to clarify confusion in the literature about the exact number of andragogical principles.

The Traditional Andragogical Model

A re-examination of andragogy necessitates a brief discussion or explanation of the traditional model. Popularized by Knowles (1968), the original andragogical model presents core principles of adult learning and important assumptions about adult learners. These core principles of adult learning enable those designing and conducting

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adult learning to design more effective learning processes for adults. The model is a transactional model in that itspeaks to the characteristics of the learning transaction, not to the goals and aims of that transaction. As such, it is applicable to any adult learning transaction, from community education to human resource development in organizations.

Core Principles of Andragogy

Depending on which citation is consulted, various authors present andragogy in different ways. Accordingly, it has often been difficult to ascertain both the number and content of the core principles of andragogy. This difficulty stems from the fact that the number of andragogical principles has grown from 4 to 6 over the years. However, the addition of assumptions and the discrepancy in the number cited in the literature has led to considerable confusion.

Figure 1 shows the six principles of the current model, as well as the ones cited in Knowles' previous works. As the figure indicates, andragogy was originally presented with 4 assumptions, numbers 2 – 5 (Knowles 1980, 1978, 1975). Assumption number 6, motivation to learn, was added in 1984 (Knowles, 1984) and assumption number 1, the need to know, was added in more recent years (Knowles, 1989, 1990).

The six core principles of andragogy included in the current model are:

1. Adults need to know whey they need to learn something before learning it.
2. The self-concept of adults is heavily dependent upon a move toward self-direction.
3. Prior experiences of the learner provide a rich resource for learning
4. Adults typically become ready to learn when they experience a need to cope with a life situation or perform a task.
5. Adults' orientation to learning is life-centered and they see education as a process of developing increased competency levels to achieve their full potential.
6. The motivation for adult learners is internal rather than external.

These core principles provide a sound foundation for planning adult learning experiences. Absent any other information, they reflect the best approach to effective adult learning.

Figure 1 – Changes in core andragogical principles

	Adult Learner 5th ed. (1998)	Adult Learner 4th ed. (1990)	Adult Learner 3rd ed. (1984)	Andragogy in Action (1984)	Modern Practice – 2nd ed. (1980)	Adult Learner 2nd ed. (1978)
Need to Know	□	□	□			
Learner self-concept (self-directed)	□	□	□	□	□	□
Learner's Experience	□	□	□	□	□	□
Readiness to Learn (life tasks)	□	□	□	□	□	□
Orientation to Learning (problem-centered)	□	□	□	□	□	□
Motivation (internal)	□	□		□		

Reframing Andragogy

The power of andragogy lies in its potential for dynamic application, not as a rigid recipe for action. However, over the years the assumptions became viewed as dogmatic and unbending principles, rather than flexible assumptions to be altered depending on the situation. There is clear evidence that Knowles never intended for them to be viewed this way. For example, Knowles stated early on that:

> My intention, therefore, was to present an alternative set of assumptions to those that had been traditionally made by teachers of children, so that others would have another choice. I saw them as assumptions to be tested (not to be presumed), so that if a pedagogical assumption was the realistic condition in a given situation then pedagogical strategies would be appropriate. For example, if I were now, at age 66, to undertake to learn a body of totally strange content (for example, the higher mathematics of nuclear physics), I would be a totally dependent learner. I would have very little previous experience to build on, I probably would have a low degree of readiness to learn it, and I don't know what developmental task I would be preparing for. The assumptions of pedagogy would be realistic in this situation, and pedagogical strategies would be appropriate.
>
> I would like to make one caveat to this proposition, though: an ideological pedagog would want to keep me dependent on a teacher, whereas a true andragog would want to do everything possible to provide me with whatever foundational content I would need and then encourage me to take increasing initiative in the process of further inquiry. (1979, 52-53)

More recently, Knowles stated in his autobiography:

> So I accept (and glory in) the criticism that I am a philosophical eclectic or situationalist who applies his philosophical beliefs differentially to different situations. I see my self as being free from any single ideological dogma, and so I don't fit neatly into any of the categories philosophers often want to box people in. (1989, p. 112)

Unfortunately, Knowles never offered a systematic framework of factors that should be considered when applying andragogy. As a result, andragogy has been criticized in two fundamental ways.

First, the andragogical assumptions about adults have been criticized for appearing to claim to fit all situations or persons (Davenport, 1987; Davenport & Davenport, 1985; Day and Baskett, 1982; Elias, 1979; Hartree, 1984, Tennant, 1986). That is, andragogy appears to claim that all adults in all learning situations fit all of the assumptions. While a more careful read of Knowles' work shows he did not believe this, andragogy is nonetheless open to this criticism because it fails to explicitly account for the differences. Pratt (1988) offered a contingency approach to adult learning that explicitly takes into account variations in adults' readiness to learn in an andragogical manner by examining dimensions of the situation and learner. Because of the conceptual uncertainty, Merriam and Caffarella (1991) go so far as to say that "since andragogy now appears to be situation-specific and not unique to adults, technically it does not qualify as a theory of adult learning" (p. 250).

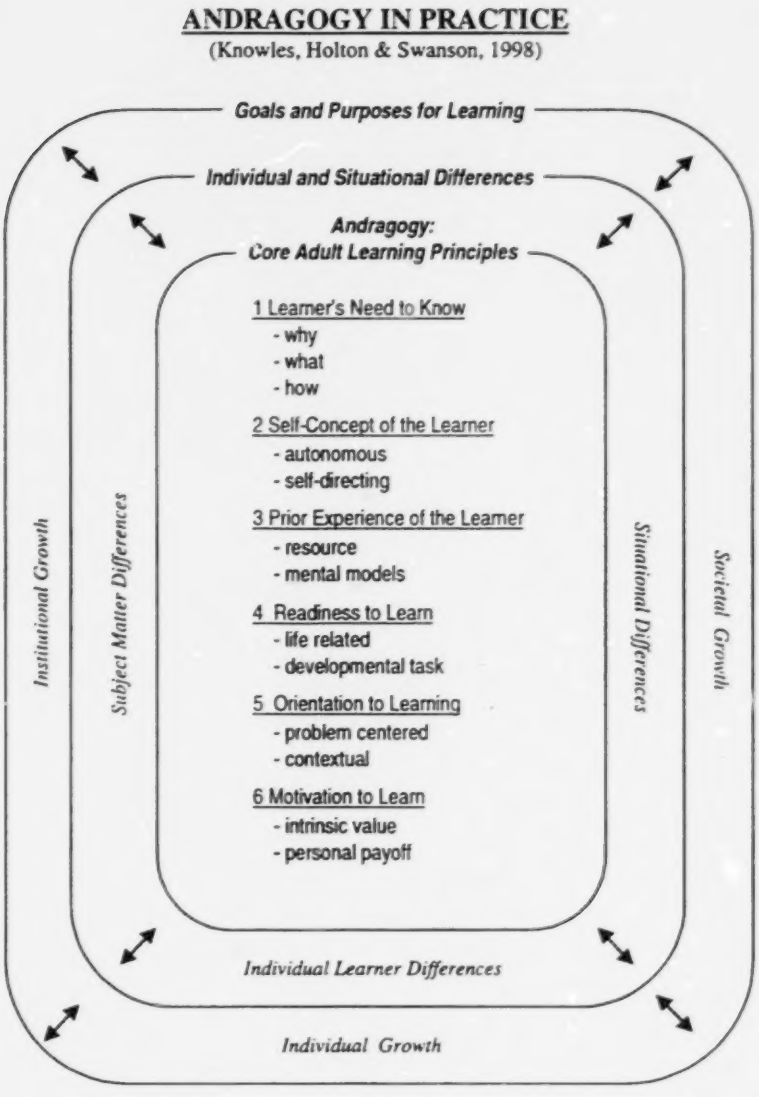
A second set of criticisms focused on andragogy's philosophical stance with regard to adult education. Grace (1996), for example, criticizes andragogy for focusing solely on the individual and not operating from a critical social agenda or debating the relationship of adult education to society. Cross concludes that "whether andragogy can serve as the foundation for a unifying theory of adult education remains to be seen" (1981, p. 227). Others have pushed for adult learning theory to reach beyond the teaching-learning transaction to encompass some elements of desired outcomes. Most prominent of these include perspective transformation (Mezirow, 1991) and a critical paradigm of self-directed learning (Brookfield, 1984b, 1987). Pratt (1993) also criticizes andragogy for not adopting a critical paradigm of adult learning.

We believe that these criticisms point to missing elements that keep it from being a defining theory of the discipline of adult education (Davenport & Davenport, 1985; Grace, 1996; Hartree, 1984), not of adult learning. What many of these critics implicitly attempted to do was to equate adult learning, and, by extension, andragogy with the discipline of adult education. Adult education as a discipline has certain philosophical foundations regarding the role of education in society and the desired outcomes from adult education (Merriam & Brockett, 1997). Andragogy's critics are correct in saying that andragogy does not explicitly and exclusively embrace these

outcomes, but they are incorrect in thinking that it should. These criticisms reflect different perspectives about the goals and purposes of the discipline of adult education, not of andragogy.

Attempts to embed the specific goals and purposes of adult education into the andragogical model of adult learning are conceptually flawed. Adult learning occurs in many settings for many different reasons. Andragogy is a transactional model of adult learning that is designed to transcend specific applications and situations. Adult education is but one field of application; others might include organizational human resource development and higher education. The debate about goals and purposes of adult education is important, but should be separated from models of the adult learning process. It seems clear that there is a need to reframe andragogy by more explicitly taking into account key factors that affect the application of andragogical principles.

Figure 2 - Andragogy in Practice Model



The Andragogy in Practice Model

Andragogy in Practice, the model depicted in Figure 2, is offered as a new approach to more systematically apply andragogy across multiple domains of adult learning practice. The three rings of Andragogy in Practice are: (1) Goals and Purposes for Learning, (2) Individual and Situation Differences, and (3) Andragogy: Core Adult Learning principles.

In contrast to the traditional model of andragogy, this new model integrates the additional influences – the uniqueness of the individuals and the situation – with the core adult learning principles. The three rings of the model interact, allowing the model to offer a 3-dimensional process for adult learning situations. The result is a model that systematically recognizes this lack of homogeneity among learners and learning situations, and effectively illustrates that the learning transaction is a multi-faceted activity. This new perspective presents a more complete model that allows for greater and more efficient application to a multitude of adult learning situations.

Goals and Purposes

"Goals and Purposes for Learning," the outer ring, are portrayed as developmental. The goals and purposes of adult learning serve to shape and mold the learning experience. In this model, goals for adult learning events may fit into three general categories: individual, institutional, or societal. Care must be taken so as not to confuse core principles of the adult learning transaction, with the goals and purposes for which the learning event is being conducted. They are conceptually distinct, though as a practical matter may overlap considerably.

Consider adult literacy programs as an example. Such programs may be conducted by an adult education center to help individuals improve life skills (an individual goal); by a corporation to improve job and organizational performance (an institutional goal); or by some other entity seeking to help a disadvantaged group of citizens improve their socio-economic position (a societal goal). While the goal differs in each of these situations, the actual learning program and desired learning outcomes may be quite similar or even identical. Therefore, andragogy is equally applicable to each scenario because andragogy focuses on the learning transaction, as opposed to the overall goal for which the program is offered. Because the goal will have an effect on the learning transaction, it must be carefully considered. For example, when offered for societal improvement purposes, extra emphasis may be placed on developing self-directedness among the learners. However, this is not part of andragogy, but the context in which andragogy is utilized.

This illustrates the strength of andragogy: it is a set of core adult learning principles that apply to all adult learning situations. The goals and purposes for which the learning is offered are a separate issue. Professionals involved in delivering adult learning programs should develop and debate models of adult learning separately from models of the goals and purposes of their respective fields within which they utilize adult learning.

The traditional view among most scholars and practitioners of adult learning is to think exclusively of individual growth. Representative researchers in this group might include some mentioned earlier such as Mezirow (1991) and Brookfield (1987, 1984a). Others advocate an individual development approach to workplace adult learning programs (Bierema, 1996; Dirkx, 1996). At first glance, andragogy would appear to best fit with individual development goals because of its focus on the individual. However, closer examination shows that andragogy's focus is really on the individual as a learner, not the purpose for which the individual engages in learning.

Adult learning is equally powerful in developing better institutions, as well as individuals. Human resource development, for example, embraces organizational performance as one of its core goals (Swanson & Arnold, 1996), which andragogy does not explicitly embrace either. From this view of human resource development, the ultimate goal of learning activities is to improve the institution sponsoring the learning activity. Thus, control of the goals and purposes really lies with the organization. The adult learning transaction in an HRD setting still fits nicely within the andragogical framework, although the different goals require adjustments to be made in how the andragogical assumptions are applied.

Societal goals and purposes that can be associated with the learning experience can be illustrated through Friere's work (1970). This Brazilian educator sees the goals and purposes of adult education as societal transformation and contends that education is a consciousness raising process. He says that the aim of education is to help participants put knowledge into practice and that the outcome of education is societal transformation. Freire believes in man's ability to recreate a social world and establish a dynamic society, and says that the major aim of education is to help people put knowledge into action. Doing so, according to Friere (1970), will enable man to change the world – to humanize it. Friere is clearly concerned with creating a better world and the development and

liberation of people. As such, it is evident that the goals and purposes within this learning context are societal. Once again though, the actual adult learning transactions fit within the andragogical framework, though with some adjustments.

Individual and Situational Differences

"Individual and Situational Differences," the middle ring of the Andragogy in Practice Model, are portrayed as variables. We continue to learn more about the differences that impact adult learning and which act as filters that shape the practice of andragogy.. These variables are grouped into the categories of individual learner differences, subject matter differences, and situational differences.

Subject matter and situational differences are the easiest to recognize and understand. Different subject matter may require different learning strategies. For example, individuals may be less likely to learn complex technical subject matter in a self-directed manner. Or, as Knowles stated in the earlier quote, introducing unfamiliar content to a learner will require a different teaching/learning strategy. Simply, not all subject matter can be taught or learned in the same way.

Similarly, different situations may dictate different teaching/learning strategies. The situational effects category captures any unique factors that could arise in a particular learning situation. For example, learners in remote locations may be forced to be more self-directed, or perhaps less so. Learning in large groups may mean that learning activities are less tailored to particular life circumstances.

Research in individual differences has been instrumental in advancing understanding of how individual differences impact adult learning behaviors. Jonassen & Grabowski (1993) present a typology of individual differences that impact on learning which incorporates three broad categories of individual differences: cognitive (including cognitive abilities, controls and styles), personality, and prior knowledge. While there remains much uncertainty in the research, the key point is clear: individuals vary in their approaches, strategies, and preferences during learning activities. Few learning professionals would disagree. At one level, merely being sensitive to those differences should significantly improve learning. Even better, the more that is understood about the exact nature of the differences, the more specific learning theorists can be about the exact nature of adaptations that should be made.

Another area of individual differences in which our understanding is expanding rapidly is adult development. Adult development theories are generally divided into three types: physical changes; cognitive or intellectual development; or personality and life-span role development (Merriam & Cafferella, 1991; Tennant, 1995). Cognitive development theory's primary contributions are two-fold. First, they help to explain some differences in the way adults learn at different points in their life. Second, they help explain why the core learning principles are exhibited in different ways at different points in life. Role development theory's primary contribution is to help explain when adults are most ready for and most need learning, and when they may be most motivated to learn.

An understanding of individual differences helps make andragogy more effective in practice. Effective adult learning professionals use their understanding of individual differences to tailor adult learning experiences in several ways. First, they tailor the manner in which they apply the core principles to fit adult learners' cognitive abilities and learning style preferences. Second, they use them to know which of the core principles are applicable to a specific group of learners. For example, if learners do not have strong cognitive controls, they may not initially emphasize self-directed learning. Third, they use them to expand the goals of learning experiences. For example, one goal might be to expand learners' cognitive controls and styles to enhance future learning ability. This flexible approach explains why andragogy is applied in so many different ways (Knowles, 1984).

Applying the Model

We turn now to an example to illustrate how to use the Andragogy in Practice model. As a general note, we have noted interesting differences in the way people apply the model, and therefore the best way to explain it. Those familiar with the six core principles of andragogy tend to want to conceptually begin in the middle of the model, working outward to adjust the six principles to fit the individual and situational differences as well as differences due to the goals and purposes. For them, the outer two rings act as "filters" through which the core principles are examined to make adjustments. Those unfamiliar with the six principles seem to prefer to start with the outer ring and work inward. For these individuals, it makes more sense to analyze the goals and purposes first, then the individual and situational differences, and then to select which of the andragogical principles fit. The core principles are then like a "toolkit" from which applicable principles are selected.

Both perspectives have merit, depending upon the application. We suggest a three-part thinking process for approaching adult learning situations:

1. The core principles of andragogy provide a sound foundation for planning adult learning experiences. Without any other information, they reflect the best approach to effective adult learning.
2. Analysis should be conducted to understand: (a) the particular adult learners and their individual characteristics; (b) the characteristics of the subject matter; and, (c) the characteristics of the particular situation in which adult learning is being used. Adjustments necessary to the core principles should be anticipated.
3. The goals and purposes for which the adult learning is conducted provide a frame that puts shape to the learning experience. They should be clearly identified and possible effects on adult learning explicated.

Where possible, this framework should be used in advance to conduct learner analysis. When used for this purpose, it is probably best to start with the outer ring and work inward. On the other hand, if one does not have much of an opportunity to analyze the learners in advance, then it may be more appropriate to begin with the core principles as a guide, and make adjustments as the other elements of the model become known. The following example will help clarify the application of the model.

A municipal government has developed a new management development program to help change the organization to a high-performance workplace. It was developed based on best practices and thinking in performance improvement leadership. The program will challenge learners' mental models of management development as it presents a new approach to managing in the public sector. An analysis of the learners indicates that they generally fit the core assumptions of the andragogical model. This presents several problems because the program can not be conducted in a completely andragogical approach. First, the ultimate goal of the program is to enhance organizational performance. Thus, learners will not have as much choice about the content of the learning (goal factor). It was determined that considerable effort will have to be devoted to convincing the learners of the "need to know" because some may not perceive they need the program. Second, most of the learners are experienced managers who consider themselves to be reasonably accomplished at their jobs. However, it is the expertise from their past experience that needs to change, so prior experience could actually be a barrier to learning (individual difference factor). Next, it was determined that few of them had engaged in self-directed learning with regard to management issues. This fact, coupled with the unfamiliarity of the material, will make self-directed learning unlikely, at least in the early stages of the program. Further complicating the design is that there is likely to be little formal payoff because public sector employment systems do not allow for performance or skill-based pay increases (a situational factor). Much of the "payoff" will be intrinsic, and learners will have to be convinced of the value. Finally, the subject matter itself will shape the learning. The approach being taught would be unfamiliar to these managers, and relies on a complex integration of theories. Thus, some portions of the program may be more didactic than others (subject matter factor).

This example illustrates how andragogy becomes more powerful by explicitly accommodating contingencies present in most adult learning situations. In addition, by separating the goals and purposes for which learning is conducted from the model of the learning transaction, the model becomes more versatile as well as more clear conceptually.

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A Holistic Model of Knowledge and Adult Learning

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This paper proposes a holistic theory of knowledge and learning. The theory posits that knowledge is consisted of three indivisible facets: explicit, implicit, and emancipatory, and that it is more important to examine the dynamic relationships among the three facets of knowledge in order to better understand different learning modes.

Keywords: Nature of Knowledge, Adult Learning, Dialectics

There are three major approaches to the nature of knowledge that have dominated adult learning literature (Mezirow, 1996). Mezirow contends that the Western rational tradition constitutes an objectivist paradigm of learning. The objectivist paradigm, or is sometimes called empirical-analytic paradigm, is a set of assumptions about reality and learning. Reality is believed to exist independently of mental representations of the world and knowledge to be objective. "The educational process is to transmit accurate representations to the real world, ideally established as such by scientific test." (p. 159). On the other hand, interpretist paradigm views knowledge as subjective and is constructed from one's experience within the frame of prior interpretation. Learning is a function of forms of life and systems of language. The third paradigm, critical theory, views learning as a transformational process. Following Habermas (1971, 1984), scholars in adult learning have critiqued the empirical-analytic tradition of the field. It is argued that the knowledge produced from such tradition has served the interests of professionalization and control, and that these interests are not emancipatory (Wilson, 1993; Thompson & Schield, 1996). From the perspective of critical theory, it is important to examine the power relationship in which the knowledge is produced and whose interest is served. The three major approaches to knowledge (i.e., empirical-analytic, interpretive, and critical) have typified efforts to define the concept of knowledge from different perspectives. These perspectives have been shaped by the examination of a limited consideration of the nature of knowledge. This paper proposes a holistic theory of knowledge and learning. The theory posits that knowledge consists of three indivisible facets: explicit, implicit, and emancipatory, and that it is more important to examine the dynamic relationships among the three facets of knowledge in order to better understand different learning modes.

Three Facets of Knowledge

All of the above mentioned three paradigms view knowledge as something there in the world, either objectively representing the reality or subjectively existing in human beings. To overcome the dichotomy of objectiveness and subjectiveness, I am arguing that we should take a holistic view. We frequently hear a saying "you need to look on the other side of the coin." In fact, there are three sides of a coin: head, tale, and edge. This principle applies to the concept of knowledge: we need to examine different facets of knowledge. Knowledge is human beings' understanding about the realities through mental correspondence, personal experience and emotional affection with outside objects and situations. This definition of knowledge has the following implications. First, knowledge exists in a state of understanding within human beings. Therefore, knowledge exists only in the interaction between human beings and the outside world. Second, knowledge is learned and cumulated from personal and social life. Consequently, knowledge is shaped by both personal inner factors and outside reality. Third, there are at least three channels that link individual inner state to outside realities: mental, behavioral, and emotional processes.

The facets of knowledge are different aspects of the way in which we know the world. We can learn not only through mental corresponding (i.e., cognitive process) but also by personal direct involvement (e.g., learned motor skills). We also know things through our emotions. Because any knowing involves a person (knower), these three knowing processes are in fact all involved and they are interrelated. Consequently, knowledge has three distinct but related facets: explicit, implicit, and emancipatory knowledge. That is to say, knowledge facets reflect different processes of knowing. A holistic theory of knowledge should include three basic facets of knowledge: explicit, implicit, and emancipatory. The explicit facet consists of the cognitive component of knowledge that represents one's understandings about the realities. Explicit knowledge is codified knowledge because it is transmittable in formal, systematic language. It is technical knowledge because it reflects one's intentional and conscious effort to understand realities to meet his/her interests. The implicit or tacit facet is the behavioral

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component of knowledge that denotes the learning that is not openly expressed or stated. In most of the cases we know more than what we think we know (Polanyi, 1967). Implicit knowledge is personal, context-specified, and therefore hard to formalize and communicate. Implicit knowledge usually comes from and exits in one's behavior, action, and accumulated experiences. However, experience itself can not automatically become knowledge. Only the learning and familiarity evolved from experience that have been confirmed to be true can be viewed as knowledge. Research has suggested that the unconscious thoughts and actions can be developed, received, stored, and recovered without the involvement of conscious awareness (Taylor, 1997). The emancipatory facet is the emotional component of knowledge and is reflected in affective reactions to outside world. Emancipatory knowledge is value-laden. It is indicated by feelings and emotions people have in relation to the objects and situations. Emancipatory knowledge defines one's view about what the world should be, and it is the result of one's efforts to seek freedom from natural and social restraints. Table 1 compares three facets of knowledge and their related characteristics.

The differences among these three facets of knowledge have both theoretical and practical importance. The explicit knowledge is based on the separation of object and subject and it serves for the interest of rationality. The implicit knowledge is established on the interrelationship between object and subject and thus is simultaneous and analog knowledge. The emancipatory facet is essential and vital knowledge that defines the meaning of an object within the subject. These three facets are different not only in nature, function, and foundation, but also in direct sources, evaluation criteria, and ultimate goals. The direct source for the explicit knowledge is logic and reasoning and it is judged by the criteria of empirical soundness, clarity, and consistency. The explicit knowledge seeks for truth and efficiency, and it tends to search for a single solution for an action that maximizes its satisfaction or utility. This facet of knowledge is facilitated by analytical intelligence and the ability to learn this knowledge facet might be measured by conventional IQ tests. The implicit or tacit knowledge derives directly from practice, experience, and recognition. It needs to be practical and communicative across situations. This facet of knowledge aims for reality, and it focuses on the effectiveness that normally requires artistic instead of scientific solutions. The ability to acquire the implicit knowledge can be viewed as practical intelligence (Sternberg, 1985, 1997). People do not just know through thinking or doing, they also acquire knowledge with their emotions and feelings. The emancipatory knowledge reflects human beings' pursuit of freedom and justice, which is advanced by values, assumptions and ethics. Serving for the quest of liberty and empowerment, the emancipatory knowledge has been evaluated by intellectual illumination and ethical responsibility. This facet of knowledge can be facilitated and indicated by emotional intelligence (Goleman, 1995, 1996). Goleman has noted that people with higher emotional intelligence tend to "have a notable capacity for commitment to people or causes, for taking responsibility, and for having an ethical outlook; they are sympathetic and caring in their relationships" (1995, p. 45).

Because these three facets of knowledge appear to be different in many aspects, researchers and theorists tend to view the concept of knowledge from one perspective or another. Consequently, only one type of knowledge seems to be valid for certain people when one facet is examined instead of a holistic look. Moreover, the academic field and related literature have been divided into camps of so called paradigms. Scholars tend to conduct their discourses within one camp or take only one perspective for the sake of consistency. Those who place their emphasis on explicit knowledge tend to examine relatively structured problems, use empirical-analytic tools of research, and build prescriptive theories and models. Those scholars who accept the implicit nature of knowledge look at less-structured problems with experiential-interpretive tools and their research outputs appear as heuristic theories and interpretations. Those who contend that emancipatory knowledge is vital for any sort of learning use such research tools as critical reflection or participatory study to probe non-structured problems, and their outcomes are normally descriptive. From a research perspective, the three facets of knowledge represent three domains of study: cognition, behavior, and affect. Each of the three domains reflects a long interest of investigation along the lines of thinking, action, and emotion respectively.

Table 1. Comparison of Knowledge Facets

	Explicit	Implicit	Emancipatory
Nature	Knowledge of rationality (mind)	Knowledge of experience (body)	Knowledge of meaning (heart)
Function	Sequential knowledge (there and then)	Simultaneous knowledge (here and now)	Essential knowledge (where and why)
Domain	Digital knowledge (theory)	Analog knowledge (practice)	Vital knowledge (spirit)
Foundation	Separation of object and subject (objective)	Interrelation of object and subject (subjective)	Object within subject (affective)
Carrier	Formal, abstract symbols & languages	Informal, concrete, and vivid experiences	Values, conscience, dignity, & ethics
Direct Source	Logic, reasoning	Practice, experience	Freedom, justice
Criteria	Empirically sound, clear, and consistency (true or false)	Workable, practical, communicative (workable or not)	Enlightening, ethical, responsible (right or wrong)
Ability to Learn	Analytical Intelligence	Practical Intelligence	Emotional Intelligence
Goal	Truth Efficiency Maximize	Reality Effectiveness Artistic	Liberty Significance Empowering
Problem Natu	Structured	Less-Structured	Non-structured
Related Theory	Prescriptive	Heuristic	Descriptive
Research Tool	Empirical-analytic	Experiential-interpretive	Critical-reflective
Research Domain	Cognition (thinking)	Behavior (action)	Affect (emotion)

Dynamic Relationships among Knowledge Facets

Although the differences among the three facets of knowledge have been long recognized, few have examined their unitary nature. While knowledge facets may come from different sources and develop toward diverse directions, as discussed above, none can simply be dismissed. A holistic theory of knowledge and learning must acknowledge all facets of knowledge. In fact, each of the three facets of knowledge provides a support needed for the other facets to exist. Explicit knowledge will exist only as meaningless facts, figures or bytes of information without the support of

other facets. People usually use "body of knowledge" to denote theories, models, empirical findings but fail to realize that these things only reflect explicit facet of knowledge. From the perspective of the holistic theory, theories and models themselves are not knowledge. They are carriers of explicit knowledge and they are simply available information when human factors are detached. As Davenport and Prusak (1998) rightly noticed, information itself is not knowledge. I think that "knowledge base" is a better term to represent explicit knowledge such as theories and models. Implicit knowledge will become random, idiosyncratic, special, and isolated events or situations without the connections of other two facets. Emancipatory knowledge will be simply emotion or affection when the explicit and implicit facets are removed. The above different terms and characteristics are divided and examined just for the discourse purpose and themselves are explicit writings with rational interest. In reality, a robust piece of knowledge consists of three interrelated facets. A holistic view of knowledge should be a dynamic dialectic among all facets.

Consideration of these facets of knowledge can be facilitated by thinking of them as angles of an equilateral triangle with the angle of the triangle being the different facets of knowledge. The inside of the triangle can be regarded as the arena of knowledge and the sides of the triangle represent interaction among the facets. While educators and researchers can view the concept of knowledge from one of the angles and work on a particular side, there is always the influence of the other two angles in the arena. Each of the angles is bounded by two angles and shaped by the inputs and influences from the other facets of knowledge. Learning can start in one of the facets and educators and learners can, consciously or unconsciously, move toward one of the directions characterized by the knowledge facets. However, any change of one facet always affects one or both of the other facets.

The dynamic relationships among the knowledge facets and related learning modes are presented in Figure 1. Three circles in the figure represent the knowledge facets and the lines with arrow refer to the interaction among the facets. It is assumed that knowledge is created through and exists in the interactions among explicit, implicit, and emancipatory facets. These relations allow us to draw at least nine modes of learning (i.e., knowledge conversion): participation, conceptualization, contextualization, systematization, validation, legitimization, transformation, interpretation, and materialization. Participation is a process of learning from practice and thereby

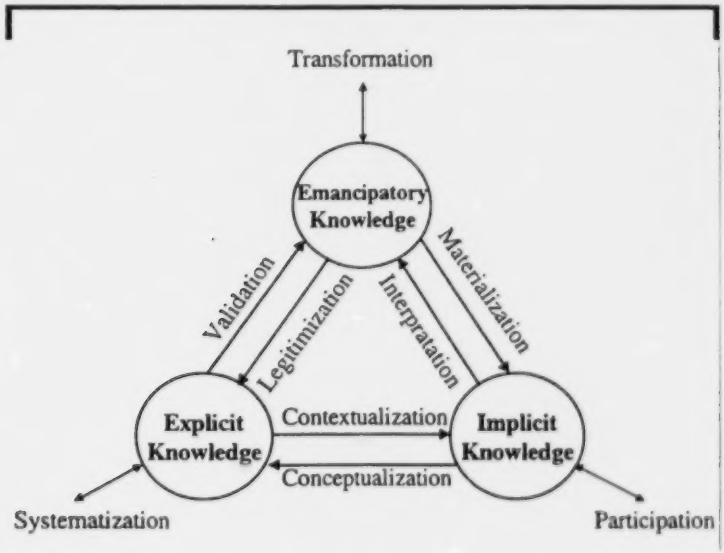

Figure 1. Three Facets of Knowledge and Implied Modes of Learning

creating implicit knowledge from experiences. The direct outcomes of the participation are unconscious mental models and technical skills such as know-how. Many learning forms such as apprenticeship, situated learning, incidental learning, interns and on-the-job-training fall into this mode of learning. Personal participation in individual and social activities will always result in implicit learning, which, in turn, develops intuitive (tacit) knowledge. Psychological studies have shown that such knowledge is optimally acquired independently of conscious efforts to learn and it can be effectively used to solve problems and make decisions (Gerholm, 1990;

Reber, 1989). If we maintain a position that knowledge is essentially implicit, then we can get a conclusion that learning can be viewed as a process of participation in communities of practice (Lave & Wenger, 1991). Conceptualization is a process of articulating implicit knowledge into explicit concepts. It converts familiarities into tangible explanations. It is a quintessential knowledge-creation process in that implicit knowledge becomes explicit, taking forms of metaphors, analogies, concepts, hypotheses, or models (Nonaka & Takeuchi, 1995). For example, a professional may summarize what have been learned from practice, reflect upon the literature in the field and write up a scholarly article for publication. The outcome of this learning process is explicit knowledge. Other professionals in the field then can learn from such explicit knowledge. The best way for them to learn is not to simply acknowledge new ideas or concepts, they have to connect and apply the new information to their particular contexts. Contextualization is a process of embodying explicit knowledge into implicit knowledge. It is the process of utilizing concepts, models, propositions in a specific context. A teacher in this learning mode examines the appropriateness of a newly developed teaching method in his/her classroom. Because there may be countless factors that affect his/her decision of adoption and the person who originally developed the method cannot anticipate all possible applicable situations, the teacher may not be able to clearly state the rationale and the process of such a decision. Therefore, such learning process that involves action or behavior will always bring about a change of implicit knowledge. Examples of this learning mode are: learning by doing, role-playing, case study, and action learning. Systematization is a process of systematizing concepts into a knowledge system with logic and reasoning. This learning process uses mind instead of body. This learning mode generally involves combining different parties of explicit knowledge in a consistent format. People exchange and combine knowledge through such forms as seminars, literature critique, or conferences. Competence-based training is a typical example of this learning mode that assumes a systematic and explicit knowledge base. Validation is a process of examining underlying values, beliefs and other kinds of fundamental learning based on explicit knowledge (which is believed to be true under rational perspective). Mezirow (1996) suggests that we establish the validity either by empirically testing to determine the truth or by appealing to tradition, authority or rational discourse. "Discourse allows us to test the validity of our beliefs and interpretations" (p. 165). Employee orientation and correctional education are two examples of this learning mode. One of the major functions of employee orientation is to assist the newcomers in learning the organizational values and expectations. It is expected that the newcomers will learn what is right and what is wrong from the standards of a particular organization, and thus change/modify their emancipatory facet of knowledge about work. Legitimization is a process of justifying explicit knowledge based upon emancipatory knowledge. For instance, many higher education institutes changed admission regulations after the civil right movement. Team building and community meetings are other examples of this learning mode. The goal of team build is to increase productivity based on trust, cohesiveness, and mutual sense of responsibility. Therefore, the essence of team building is to revise or develop explicit knowledge (i.e., clearly specified effective working conditions) by building on team members' emancipatory knowledge of the work. The effect of emancipatory knowledge on explicit knowledge can also be easily examined at the level of individual learning. One will simply reject certain information if it is contradicted to his/her fundamental values or beliefs. Transformation is a process of converting an old meaning scheme (i.e., values, feelings, ethics, etc.) into another one. It should be noted that not every transformative learning occurs in a positive direction. One longitudinal study shows that adult life experiences can result in diverse development outcomes (Merriam & Yang, 1996). For example, those who experienced a period of unemployment have expressed more sensitivity to social and economic inequality, but they felt to be marginalized, vulnerable, and controlled by external forces. Some life experiences may bring about learning with negative interpretation (Merriam, Mott, & Lee, 1996). The key to understand such complicated learning processes lies in the dynamic interactions among three knowledge facets. Some examples of transformative learning include: participatory study, non-violence action, and critical reflection. Materialization is a process of transferring emancipatory knowledge into tacit knowledge. This learning mode includes such methods as action learning, task-force, and community development. Those who utilize what they have learned from the participatory action research to improve the quality of their daily life are in the process of materialization. Interpretation is a process of making and/or revising meaning scheme from tacit learning and direct experiences. People who feel empowered and have a new look about life through a participatory action research have been involved in the learning process of interpretation. Instructional methods such as critical questioning and conscious awareness group are examples of interpretation process.

While three different and yet interrelated facets of knowledge are identified and learning modes are defined, it should be emphasized that learning rarely takes place in one domain. Examples in the previous paragraph were used to illustrate dominated learning modes for the interactions among knowledge facets. In reality, most learning activities involve more than one of three facets and a number of interactions. For example, while the main focus of a conscious awareness group is to interpret meanings based on participants' experiences, the facilitator and

participants might borrow or create explicit concept to validate their interpretation. In so called instrumental learning (Mezirow, 1990), one might involve direct changes only in explicit and implicit domains. But the emancipatory facet is also visible and it plays the function of legitimizing new information. In such learning situations, new information is congruent with one's fundamental beliefs. Most of our learning activities are instrumental rather than transformative.

Implications of the Holistic Model of Knowledge

Knowledge Facets and Paradigms of Learning and Research

There has been a lot of discussion on the paradigms of learning and research (Merriam, 1991; Mezirow, 1996). From the perspective of the proposed theory of knowledge and learning, contemporary paradigms have been evolved with emphasis on one facet of knowledge or another. The positivist or objectivist paradigm posits that only explicit facet is valid knowledge (Searle, 1993). Learning occurs as learners relate concepts descriptive of the new knowledge to previous knowledge within their cognitive structure. The integration of new and previous knowledge occurs through changes in the learners' conceptual structure. Concepts are developed and stored in a hierarchical structure. The positivist paradigm assumes that human beings are rational and take actions based on explicit knowledge. The essential element of the rationality is a conscious goal and the best action selected from all relevant alternatives that maximize the promise of reaching that goal. Unfortunately, such perspective ignores or pays less attention to the roles of unconscious learning and learning in the affective domain.

The interpretive paradigm emphasizes the implicit nature of knowledge and the changing influences of reality. Knowledge is acquired only through experiences and direct engagement in practice (i.e., participation) (Lave & Wenger, 1991). Mezirow (1990) contends that the learning process involves looking at past experiences, new experiences and reflecting on these for the purpose of making meaning. "Learning may be defined as the process of making a new or revised interpretation of the meaning of an experience, which guides subsequent understanding, appreciation, and action" (p. 1). Observing the dynamic world and the complexity of human communication, the interpretive paradigm asserts that realities are multiple and subjective and that truth is relative. Consequently, such assertion poses a dilemma. Do we want the communication of our interpretations to be as clear as if there is a single reality or, with multiple realities, a confusion that leads to no action? Such dilemma can be found from Mezirow's transformation theory. On one hand, this theory rejects positivist notion of absolute truth and it assumes that knowledge is subjective. On the other hand, this theory "seeks to establish a general, abstract, and idealized model which explains the generic structure, dimensions, and dynamics of the learning process" (Mezirow, 1996, p. 166). From the perspective of the holistic theory, all theories serve as carriers of explicit knowledge and thus have positivist elements.

The critical paradigm involves a commitment to deliberate action for justice in society where the existing social structure is seen as coercive and oppressive. It argues any adequate approach to educational theory must provide ways to distinguish ideologically distorted interpretations from those that are not (Carr & Kemmis, 1986, p. 129). Although this paradigm strongly advocates the rejection of positivist notions of rationality, objectivity and truth because of its danger to move toward hegemony, explicit learning (with a tendency of instrumental rationality) remains the major source of validation and justification (Mezirow, 1996). Without the support of two other facets, emancipatory knowledge might lead to "false consciousness".

To sum up, all paradigms have limited perspectives about knowledge and we should end paradigm wars. We need a holistic view of knowledge with a dialectic perspective. That is to say, it is necessary to realize both contradictory and confirmatory nature of knowledge. On one hand, three knowledge facets have different characteristics and move toward different directions. On the other hand, there are dynamic relationships among these facets. More importantly, knowledge is changing and learning takes place along with any change of the three knowledge facets. Consequently, while scholars and practitioners may limit their work only in one or two facets, they need to pay appropriate attention to all knowledge facets.

Implications for Adult Learning and Human Resource Development

The proposed holistic theory of knowledge provides a useful framework to reexamine conventional adult learning concepts, namely andragogy, adult development, experiential learning, feminist pedagogy, self-directed learning, and transformation theory. For instance, andragogy recognizes adult learners' experiences that can be a valid source of learning and their self-concept of responsibility. However, the dynamic relations between this learning source and other sources have not been clearly outlined. Therefore, the actual role of the instructor is not

well defined. Some instructors call themselves facilitators, yet others assume the role of experts. The proposed theory of knowledge and learning suggests that instructors have multiple roles because learning takes place in a number of modes. In one situation, which has clearly defined subject matter and consensus learning objectives, it is quite appropriate for an instructor to deal mainly with explicit knowledge and work as an expert. In another situation where learners are experienced practitioners and the objective is to exchange those hands-on experiences, one might want to assume a facilitator's role. This is because the instructor needs to provide adequate opportunities for the participants to externalize their implicit knowledge cumulated from their practice.

The difference between the concepts of andragogy and pedagogy can also be examined from the emancipatory facet of knowledge. Children in schools are normally assumed to receive knowledge and values in a passive way, and they are not expected to make the judgement of right or wrong. However, adult learners' various concerns stemmed from different value systems are legitimate contents in the adult learning process. In other words, self-directness is emancipatory right for all adults.

The proposed holistic theory of knowledge and learning also provide meaningful implications for both research and practice in human resource development. For instance, the theory suggests that we need a holistic perspective about different factors influencing the transfer of learning and performance. Traditionally, explicit knowledge has been viewed highly and thus IQ (the ability to learn explicit knowledge) has been used in many processes of human resource development such as employee selection and performance prediction. The holistic theory suggests a multi-facet nature of knowledge and learning and thus calls for a multiple intelligence approach. I believe that all three facets of knowledge are relevant in any training, though we do not have to allocate our resources and time equally among them.

Conclusions

The paper presents a holistic theory of knowledge and learning. By examining the major characteristics of three knowledge facets, it is argued that learning can be understood within the interactions among the three facets of knowledge. The conventional paradigms assume that they are divisive and thus have failed to integrate the dynamic relationships among knowledge facets. Therefore, research and theory building need to consider the nature of knowledge facets. Theories must meet the requirements of empirically sound, communicative clarity, and critical analysis (Brookfield, 1992). Clearly, more research needs to be done to test and validate the proposed theory. Because of the space limitation, this paper has largely focused on the nature of knowledge and learning at the individual level. Similar theorization needs to be done at the organizational level to explore the effective ways of managing knowledge and learning in today's ever-changing world.

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The Nature of Adult Workplace Curiosity

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A number of measurement forms have been used to guide curiosity research. An analysis of the structure and content of these measures was investigated to clarify the nature of the curiosity construct as it pertained to working adults. In this study, 233 adults ranging from 17-60 years of age were administered four well-known curiosity instruments. The scores were factored using a Principal Components Analysis and rotated to a varimax solution. Two clear and stable factors (by gender) were identified. Recommendations for future research in the field of HRD were discussed.

Keywords: Workplace, Curiosity

Robinson and Stern (1997) and others (e.g., King, 1998) have recently called attention to the relevance of adult curiosity in the workplace. King claimed that curiosity was a "natural personality trait, ...perhaps stronger in some people than in others," and it served as a basis for creativity in competitive work environments (p. 188). She stressed that from curiosity grows the motivational drive to know or learn and do more. Robinson and Stern (1997), on the other hand, considered curiosity more as a motivational state that impelled employees to seek out diverse stimuli and pursue self-initiated activities, which ultimately contributed significantly to corporate creativity. Robinson and Stern, citing the work of Arthur Koestler, declared that the intellectual curiosity we all possess leads us to explore and create, and initiate new activities. They insisted it was from these self-initiated activities that unexpected creative acts do occur. They noted further that by encouraging employees to seek diverse stimuli that promote learning about things that might not be directly related with their jobs, curiosities can be explored and possible new, unexpected, and creative applications for their learning could be found. Alternatively, in an empirical investigation of workplace curiosity, Reio (1997) determined that state and trait curiosity were both important components of successful socialization-related workplace learning and job performance. Building on the seminal work on curiosity by Daniel Berlyne (1960), he found support for the notion that curiosity and information seeking played a role in acquiring the information vital for newcomer job adaptation and job performance.

Clearly, then, King (1998), Robinson and Stern (1997), and Reio (1997) all have considered the nature of adult curiosity, either as a personality trait or motivational state, to be largely an information-seeking activity, aroused from conceptual conflicts and a lack of information, that results in creating new, useful knowledge. The problem is, this information-seeking or "cognitive" variety of curiosity may not be unidimensional (Boyle, 1983; Byman, 1993; Giambra, Camp, & Grodsky, 1992; Malone, 1981; Spielberger & Starr, 1994), nor is it the only kind of curiosity that may be of interest to learning endeavors (Bjorck-Akesson, [cf. Berliner & Calfee, 1996]).

Over the past several decades, a variety of definitions and descriptions and systems has been developed together with a wide range of new terms to describe the psychological construct of curiosity. Curiosity as a motivational state and personality trait, "sensation seeking," "exploration," "novelty seeking," and "interest" have all been used as interchangeable terms, while at the same time other researchers have considered them as being quite separate constructs (Krietler & Krietler, 1994). The structure and content of the instruments developed to measure these separate constructs, along with their theoretical underpinnings, have been scrutinized by researchers with confusing results as well. Some researchers have argued that the range of behavior described as curiosity is two-dimensional (e.g., Langevin, 1971), while others have claimed that curiosity is best thought of as being three or more dimensional (e.g., Krietler, Zigler, & Krietler, 1984). Surely, if meaningful research about curiosity and its role in various important contexts such the workplace is to be undertaken, a better understanding of the exact nature of the curiosity construct is needed.

Interestingly, almost all of the work concerning elucidation of the curiosity construct has been undertaken with children and/or college students. Langevin (1976), re-examining his prior curiosity research (1971) with a sample of Canadian children, utilized what he considered an adult sample which consisted of 53 teacher education students and 30 hospitalized schizophrenics. He concluded that the two dimensions he previously found in his factor-analytic study seeking clarification of children's curiosity (i.e., "breadth-of-interest" and "depth-of-interest") were simply artifacts of the different types of measurement forms he used. Ainley (1987) followed Langevin's research and controlled for the problems associated with his study by using a much larger sample (Australian), all the same type of measurement instruments (self-reported), and what she considered to be "adults," i.e., college students with a median age of 20 years. She concluded that Langevin's (1971) early work was correct, and curiosity

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truly consisted of two factors, breadth- and depth-of-interest. (Giambra et al., [1992] also supported using Ainley's two-factor curiosity interpretation when discussing adults of any age for ease of understanding when comparing different age groups.) Spielberger and Starr (1994), too, used university students (American) in their factor-analytic work investigating the nature of curiosity and described two distinct factors ("Information Seeking" and "Experience Seeking"), although not explicitly referring to their sample as being comprised of adults. Thus, a number of researchers have found the curiosity construct to be multidimensional, and although there may be little reason to expect that curiosity's dimensionality should be distinctly different for populations of non-college age working adults, this information gap should be explored as almost none of the research concerning adult curiosity and its nature has been undertaken with typical working adults. Even less research has been conducted about conceivable gender differences (Spielberger & Starr, 1994).

To help direct future HRD research where the full benefits of promoting curiosity in the workplace can be understood, a much better awareness of the true nature of the construct is vital. A very real need exists to make clear the possible number of adult curiosity dimensions, their interpretation, and the status and nature of likely additional factors. As an engaging area of inquiry, male and female populations of subjects other than college students needed to be investigated to assist in rendering intelligible curiosity's likely multidimensional nature. Thus, the purpose of this study was to investigate the dimensionality of the curiosity construct, with an adult working population, by gender, in an effort to gain conceptual clarity about its nature and definition, thereby hopefully facilitating future HRD research into curiosity's viability as a significant component of learning in workplace contexts and beyond.

The following hypotheses guided this research:

Hypothesis 1. The curiosity construct is multidimensional.

Hypothesis 2. The number of curiosity dimensions will be equal for both working adults and college-age adults.

Hypothesis 3. The number of curiosity dimensions will be equal for both males and females.

Method

Subjects. The participants in this study consisted of 152 men and 81 women, 17 to 60 years old, from four companies in the service industry (N=233).

Instrumentation. From the number of curiosity measures reported in the literature, four well-studied instruments with 12 subscales were selected for use in this study. All of the measures chosen were self-report, paper-and-paper questionnaires as recommended by Ainley (1987). Internal consistencies ranged between .69 and .88 for all but one of the subscales which was .48 (Experience Seeking subscale of the Sensation Seeking Scale).

The selected measures were: The Melbourne Curiosity Inventory (MCI; Naylor, 1981), the State-Trait Personality Inventory (STPI; Spielberger, Barker, Russell, Silva De Crane, Westberry, Knight, & Marks, 1980), the Sensation Seeking Scale (SSS; Zuckerman, 1979), and the Novelty Experiencing Scale (NES; Pearson, 1970).

The MCI consisted of one 20-question state and one 20-question trait subscale of curiosity, while the STPI had 10-question state and trait curiosity subscales; both were considered to be measures of information-seeking or the cognitive kind of curiosity. The NES, with its four 20-question subscales, included two subscales representing cognitive curiosity (Internal and External Cognitive; NES-IC and -EC) and two subscales representing the sensation-seeking kind of curiosity (Internal and External Sensation; NES-IS and -ES). With the sensation seeking kind of curiosity, novel sensations and changing experiences are sought out more often merely to experience them, not necessarily to acquire information and knowledge per se. The SSS consisted of four 10-question subscales measuring four dimensions of the sensation seeking kind of curiosity: Thrill-and-Adventure Seeking (SSS-TAS), Disinhibition (SSS-DIS), Boredom Susceptibility (SSS-BS), and Experience Seeking (SSS-ES). Thus, the MCI, STPI, NES, and SSS are essentially trait measures of curiosity, with only the MCI and STPI including a state curiosity subscale.

Procedure. The selected curiosity measures were administered to all 233 subjects at their places of work along with a demographic survey. The four companies, all operating in the Washington, DC metropolitan area, participated on the condition of anonymity and were fully informed of the results. The purpose of the study was first explained to each subject, and the measures were then distributed, with an average administration time of 45 minutes per individual.

Combination of the Sample. One-way ANOVAs (1 X 4 groups) were conducted and patterns of partial correlations were examined for each of the variables of this study. On the basis of the lack of a significant difference between the four groups with regards to their scores on the curiosity instruments and the consistency of

the correlational patterns, it was deemed appropriate to combine the four samples. Factor-analytic work performed later in the study further supported the sample combination.

Data Analysis. All data analyses were performed with the Statview 4.0 statistical routine.

Results

As was previously endorsed by Ainley (1987), the scores from each curiosity subscale were entered as variables in a factor analysis. Initially, the Principal Components Analysis (PCA) factor extraction method was performed on all variable scores of the 12 subscales based on the matrix of their Pearson product-moment correlations. Using the Kaiser Criterion, where all factors with eigenvalues greater than one are retained and usually rotated for the final solution, only four of the five factors were extracted.

As a general rule of thumb, after a PCA, an acceptable number of eigenvalues greater than one should be between the number of variables divided by five and the number of variables divided by three (Tabachnick & Fidell, 1989). Since there were 12 variables, one would predict having between two and four factors, and there were four.

The eigenvalues of the four identified factors were 3.63, 2.18, 1.51, and 1.25, accounting for 30.3 percent, 18.2 percent, 12.6 percent, and 10.4 percent of the total variance, respectively. Consequently, 71.5 percent of the total variance was explained by the four extracted factors. A three-factor solution, too, was examined as advocated by Boyle (1989), and Byman (1993). The three factors accounted for 61.1 percent of the total variance.

Other factor-analytic research on similar self-reported, questionnaire measures of curiosity (e.g., Ainley; Langevin, 1971) claimed, in the interest of clarity and parsimony, that two curiosity factors would be sufficient to describe the curiosity construct. Cohen and Cohen (1983) would seem to agree with this "less is more" approach, as this approach assures "more statistical test validity, more power, and more clarity in the meaning of the results" (p. 171). Recognizing that the Kaiser Criterion may over- or underestimate the number of factors (Tabachnick & Fidell, 1989), a scree test was used as a second criterion. Two factors were comfortably identified by this method (clearly supporting hypothesis one). With this in mind, a two-factor solution was examined as well and the total variance explained was 48.5 percent.

Once the set of two, three, and four factors were extracted from the correlation matrix by the PCA, they were rotated to increase interpretability of the factor solution. Thus, to increase the ease of interpreting, describing, and reporting the results, a varimax rotation (orthogonal, factor scores were generated and subsequently used for predictive procedures not part of this study) was performed, as recommended by Tabachnick & Fidell (1989). The results of the varimax rotations are located in Table 1.

Careful examination of the two-, three, and four-factor solutions yielded interesting results. With the four-factor solution, both of the state and trait measures of the MCI and STPI loaded on Factor 1. This reflects the moderate to high correlations among the MCI and STPI subscales, and the significant overlap between the state and trait measures, which supported Spielberger and Starr's (1994) findings. Only two curiosity subscales loaded on Factors 2 and 3, indicating that they may be unstable factors and should be viewed with caution (Tabachnick & Fidell, 1989). Factor 4 was also difficult to interpret because of the number of cross-loadings of the variables. Thus, the four-factor solution seemed at least somewhat suspect.

A three-factor solution, although strongly advocated in the literature by Boyle (1989) and Byman (1993), was unclear as well, as the SSS-ES loaded ambiguously on both Factors 2 ("Venturesomeness" as advocated by Byman) and 3 ("Experience Seeking" as recommended by Olson & Camp [1984]). Moreover, both the NES-IC and -EC subscales loaded ambiguously on Factors 1 ("Cognitive Curiosity" as named by Malone [1981]) and 2.

In the two-factor model, all but one of the loadings of the SSS subscales and NES' sensation subscales loaded clearly on Factor 2. The second factor closely resembled Ainley's (1987) "breadth-of-interest" curiosity factor and because of its sensation seeking nature, this factor will be called "Sensation Seeking" henceforth. Factor 1 had reasonably unambiguous loadings. The first curiosity factor closely resembled Ainley's "depth-of-interest" curiosity scale and because of its cognitive nature, this factor will be called "Cognitive Curiosity," as first proposed by Malone (1981). Consequently, the second hypothesis was supported which specified that there would be no difference in the number of curiosity factors between samples of college students and working adults. This result is particularly interesting as it has never been explored.

Upon examining the factor structures for gender differences, all of the subscales loaded almost identically for both genders. Thus, the two-factor solution was stable for both genders, fully supporting the third hypothesis.

Table 1

Varimax Rotation of Two, Three, and Four Curiosity Factors: Curiosity Subscales

Scale	Four-Factor Solution				Three-Factor Solution			Two-Factor Solution	
	1	2	3	4	1	2	3	1	2
MCI-T	85	05	02	16	85	11	04	81	04
STPI-T	84	04	02	08	84	01	01	77	09
STPI-S	84	04	01	05	82	03	02	76	03
MCI-S	80	00	10	13	80	04	09	78	08
NES-ES	02	90	11	14	11	79	18	07	76
SSS-TAS	02	90	07	06	09	74	15	08	69
SSS-BS	03	04	86	02	01	03	84	23	46
SSS-DIS	08	24	77	09	12	15	79	27	59
NES-IS	01	13	13	79	79	60	02	33	48
NES-IC	37	02	30	75	75	54	40	72	08
NES-EC	34	34	24	60	43	58	28	63	28
SSS-ES	02	01	53	55	16	35	43	13	52

Note. Decimal points excluded.
Factor loadings ≥ .30 are significant. All bold numbers are negative loadings.

Rationale for the Two-Factor Curiosity Solution. In the four-factor solution, two of the factors had but two significant loadings which indicated factor instability and need for extreme caution in interpreting the results (Tabachnick & Fidell [1989] recommended it may be best to ignore this type of factor because "one never knows if such factors are 'real,'" p. 605). In the three-factor solution, there were also a number of significant cross-loadings (4) among the variables (especially between Factors 1 and 2). Accordingly, based on the scree test, the results of this research, and prior research which favored the parsimony of the two-factor model (e.g., Ainley, 1987), a two-factor solution seemed most appropriate. Yet, are these results conceptually sound?

Malone (1981) claimed that curiosity could be best thought of as being separated into cognitive and sensory components, which the two-factor solution from this study clearly does. Langevin's (1971) and Ainley's (1987) research supports this interpretation as well. While the four-factor solution indicated that curiosity could be thought of as Cognitive Curiosity, Venturesomeness, Experience Seeking, and "Novelty Seeking," respectively, more research would be needed to determine whether the Venturesomeness and Experience Seeking factors are truly unique factors. Intuitively, the difference between the two factors is quite minor as they both encompass the orientation to experience change and variation, despite social or physical risks.

In the three-factor solution, all of the NES' subscales loaded on both the Venturesomeness and Cognitive factors suggesting the instability of the Venturesomeness factor. This is in contradiction to the interpretation of Byman (1993) who re-analyzed Ainley's (1987) original data and claimed there was a very real need to include the Venturesomeness-curiosity factor to fully understand the curiosity construct; yet, it is clear Ainley's data only called for a two-factor interpretation as the third factor in her analysis had but two significant loadings. In addition, results of her scree test called for but a two-factor interpretation. In this study, the Venturesomeness factor is not consistent between the four-and three-factor solution.

Therefore, while it is acknowledged that the four- and three-factor interpretations may have merit, there is a lack of sufficient empirical evidence to fully support them. The lack of conceptual clarity is also a concern. Thus, for the purposes of this study, a two-factor curiosity solution was deemed to be most reliable.

Discussion

These results lend support to the two-factor interpretation of adult curiosity first reported by Ainley (1987) and Langevin (1971) with college students and children, and contradicts the findings of researchers like Byman (1993) who favored viewing curiosity as consisting of three and possibly more dimensions. Moreover, there was no evidence of a single, general curiosity factor as was first predicted by Berlyne (1966), the "Father of Curiosity" and later partially supported by Langevin (1976). Rather, the factor structure of the test scores, by gender, demonstrated

the multidimensional nature of the curiosity construct by the existence of two clear and parsimonious groupings within the set of adult curiosity scales.

The findings of this study indicated that a two-factor interpretation of adult curiosity provided an appropriate classification system for curiosity with what this researcher considers as "real-world adults," placed in a real-world context like the workplace. The two-factor distinction provides clarity about adult curiosity's exact nature and definition, and would be useful for guiding further research in the field of HRD by providing a clear point of departure for exploring the role and meaningfulness of curiosity as a motivator and promoter of learning. For instance, the factor scores generated from this study could be used in regression models for predictive procedures about relevant workplace variables, as was done by Reio (1997). Further, the curiosity factors could be used in a priori proposed theoretical models to test the fit of structural models to the research data.

The results of this research help to explain the nature of adult curiosity and thus clear the path for future researchers who might be interested whether and how the Cognitive or Sensation-Seeking types of curiosity have positive or negative roles in the process of workplace learning. This new knowledge would be also be helpful in exploring which type of curiosity is more valuable in fostering workplace creativity, and in which particular situation and context. Other research directions might include: What are the best methods of promoting the two types of curiosity in formal and informal learning endeavors? Can curiosity in general be used in disparate workplace cultures to promote adaptation to change? Is the desirability of curiosity more of a cultural phenomenon that has little relevance in non-western oriented workplaces? Are there gender or ethnic differences in this social desirability as well? Is there such a thing as "too much" curiosity? The field of HRD would benefit much from such knowledge.

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